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INTRODUCTION

Air guns are weapons that use compressed air as a propellant to fire pellets, commonly referred to as diabolo projectiles, and have lower kinetic energy compared with conventional firearms (1,2). First introduced in the 15th century, air guns became widespread by the late 18th century and were used for hunting, sporting activities, target practice, and firearms training (3,4).

Modern air rifles, however, are capable of muzzle velocities up to 365 m/s—surpassing that of many small-caliber firearms (5). Despite this potential danger, air guns remain widely accessible, often sold without licensing requirements and commonly regarded by the public as harmless toy-like devices (6,7). This misconception persists even though such weapons can cause severe, life-threatening injuries leading to morbidity and mortality (2,8).

Murder by air rifle: A case report

Abstract

Air guns, which use compressed air to propel pellets known as diabolo projectiles, are often perceived as harmless toy-like weapons. However, advances in pressure mechanisms have increased their lethality, and fatal cases have been reported.

We report the case of a 50-year-old man who died as a result of multiple air rifle injuries. Autopsy revealed seven pellet wounds, most likely caused by five shots. One pellet fractured the mandible, penetrated the neck and chest cavity, injured the ascending aorta, and lodged near the left first rib. Another entered the abdomen, injured the left kidney, and was found at the third lumbar vertebra. Two pellets traveled subcutaneously and exited the body, while a fifth produced only a superficial abrasion. The cause of death was determined to be major vascular and visceral organ injury with massive internal hemorrhage secondary to air rifle pellet trauma.

This case illustrates the severe and often underestimated lethality of air rifles. Although widely regarded as recreational devices, these weapons can cause penetrating trauma comparable to that of conventional firearms, especially when vital structures are involved.

Air rifles should not be considered toys. Their manufacture, distribution, licensing, and use should be strictly regulated, with attention to age restrictions and procurement requirements, to prevent serious injuries and fatalities.

Keywords: Air rifle, fatal injury, murder, autopsy

In this report, we present a case of fatal air rifle injury involving intra-abdominal organ and major vascular trauma, aiming to highlight the underestimated lethality of air guns.

CASE REPORT

The case involved a 50-year-old male, who was taken to the University Hospital Emergency Service in his province after sustaining an air rifle injury during a dispute over debt. Despite resuscitative interventions, the patient was declared dead, and both external examination and autopsy were performed by us on the same day.

During the external examination and autopsy, the following findings were recorded:

- A 0.8 × 0.6 cm air rifle pellet entry wound located 1.5

cm below the corner of the right lip on the right side of the chin (no: 1).

- A 0.5×0.5 cm pellet exit wound on the left side of the mentum (no: 2).
- A 0.8×0.8 cm pellet entry wound in the right zygomatic region (no: 3).
- A 1×0.6 cm pellet entry wound surrounded by ecchymosis, located 5 cm below the midpoint of the right clavicle (no: 4).
- A 1×0.9 cm pellet entry wound 5 cm below the intersection of the left anterior axillary line with the costal arch (no: 5).
- A 1.1×1 cm pellet exit wound on the lateral side of the upper edge of the right scapula (no: 6).
- A 2.9×1 cm abrasion, likely caused by a pellet, located 8 cm below and 6 cm lateral to the umbilicus (no: 7).

In the internal examination, sub-adventitial hemorrhage extending from the aortic root to the ascending aorta was observed, as well as a hematoma in the left perirenal region. Airgun pellet-related injuries were identified on both the anterior and posterior surfaces of the left kidney, 2 cm below the hilus at its lower pole.

A total of two pellets were recovered: one 0.5 cm diameter pellet lodged between the left clavicle and the 1st rib, and another 0.5 cm diameter pellet located in the soft tissue posterior to the lumbar vertebral corpus (Figure 1–3).



Figure 1: Removed 0.5 cm diameter air rifle pellet

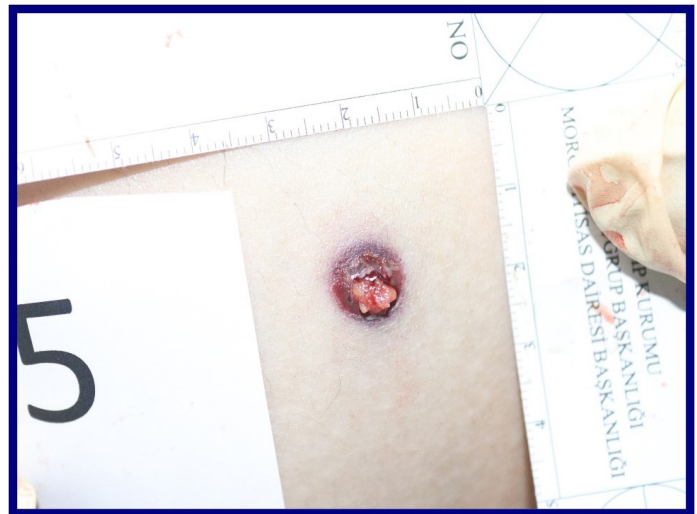


Figure 2: Entry site of a 0.5 cm diameter air rifle pellet located between the left clavicle and the first rib

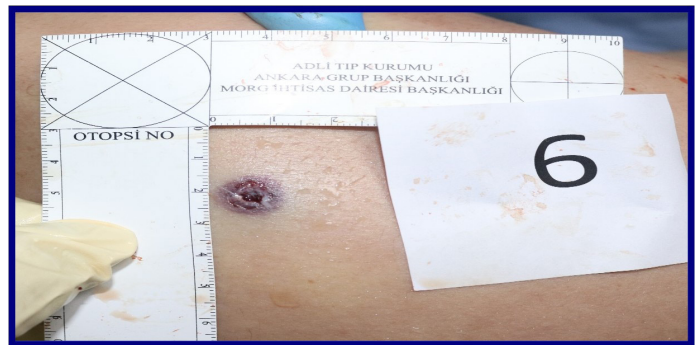


Figure 3: Entry site of a 0.5 cm diameter air rifle pellet within the soft tissue posterior to the lumbar vertebral corpus

A total of seven air rifle pellet wounds were identified on the patient's body. During the external examination, it was noted that the pellet labeled as number 1 originated from number 2, and the pellet labeled as number 4 originated from number 6. The air rifle pellet entering from the wound described as number 3 caused a fracture in the right ramus of the mandible as it traveled from top to bottom, right to left, and slightly front to back. It then moved through the soft tissues of the neck, causing an injury in the distal ascending aorta, before remaining behind the left clavicle, at the upper medial aspect of the 1st rib. The air rifle pellet described as Figure 5 passed through the retroperitoneal space from left to right, front to back, causing injury to the left kidney and remaining in the soft tissue posterior to the lumbar vertebral corpus (Figure 4–5).

100 cc of semi-clotted blood was found in the left chest cavity, and 300 cc of semi-clotted blood was found in the pericardial cavity.

After the autopsy, it was determined that the cause of death

was internal organ damage, major vascular injury, and internal bleeding due to air rifle pellets.

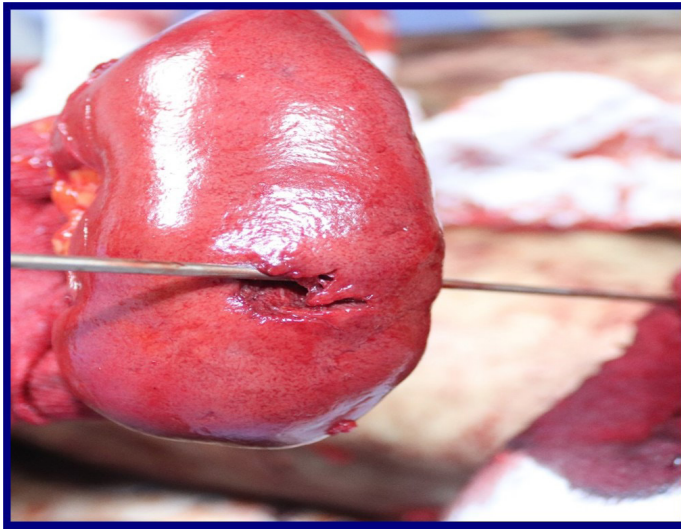


Figure 4: Trajectory of an air rifle pellet passing through the retroperitoneal space (left to right, anterior to posterior), causing injury to the left kidney

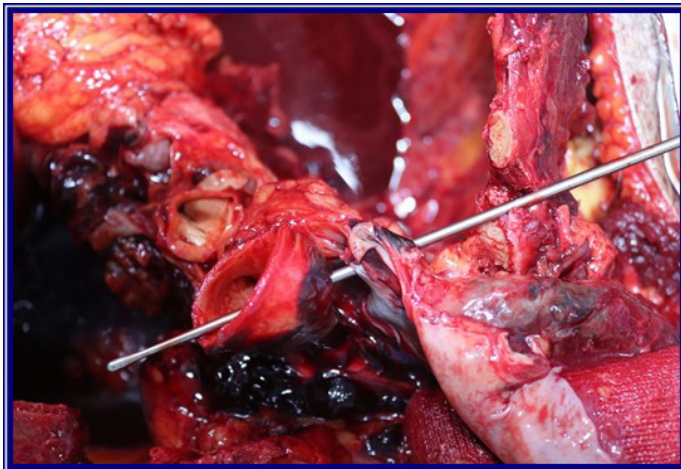


Figure 5: The air rifle pellet cause of injury to the left kidney and remaining in the soft tissue posterior to the lumbar vertebral corpus

DISCUSSION

The global prevalence of injuries caused by air guns remains uncertain. In the 1990s, the number of fatal cases reported in the literature was relatively low; DiMaio reported only four fatal air gun-related cases throughout her career. However, the number of fatal air gun injuries has been increasing in recent years (9). In a study conducted in the United States, it was reported that an average of 30,000 air guns are sold annually, approximately 33,000 individuals seek medical attention due to air gun injuries, and around 33 people die each year from such injuries. Because air gun injuries are often recorded as nonspecific gunshot wounds rather than specifically as air gun-related damage, the true incidence of injuries and deaths is likely underestimated (10-12).

Since air guns are sold without a license, there is also a lack of accurate statistical data on air gun injuries both in our country and worldwide. According to the 2017 Individual Armament Report of the Private Security Department of the General Directorate of Security, the number of licensed firearms has decreased when population growth and time trends are considered. However, an examination of the last 10 years of crime statistics shows that 25,547 crimes were committed with licensed firearms, whereas 159,123 crimes were committed with unlicensed firearms (13). The high prevalence of crimes involving unlicensed firearms may be explained by several factors, and air guns are likely to be one contributing factor.

Studies show that air gun injuries most frequently result from accidental events (14-16). Cases of homicide and suicide involving air guns are comparatively rare, and it has been reported that males are disproportionately affected (17). In our case, the incident represented a homicide, and similar to the trend in the literature, the victim was male.

Air gun injuries most often involve the ocular region, followed in frequency by injuries to the lower extremities, head, upper extremities, thorax, neck, and abdomen (4). In a study examining five deaths caused by air guns, one of the two shots striking the chest produced an aortic tear (12). Similarly, another case described a 6-year-old boy who died of exsanguination after an air rifle pellet ruptured the aortic root (2).

In our case, it was determined that the pellets caused multifocal injuries involving the head, neck, thorax, and abdomen. During their course, the pellets caused a major vascular lesion in the thorax (ascending aortic injury) and a parenchymal injury in the abdomen (left kidney lesion). Notably, ocular and lower extremity injuries — the most frequently reported sites in the literature — were not observed.

Air rifle pellets can cause significant internal organ damage after penetration, and due to their relatively low kinetic energy, they may remain lodged within the affected organ or surrounding tissue. In many studies, no exit wounds were observed in patients injured by air rifle pellets (5, 8, 12). In one report, a 12-year-old boy was accidentally shot in the umbilical region at close range, yet the pellet remained anterior to the L4 vertebra (18). The degree of tissue damage and depth of penetration caused by air gun pellets varies depending on the weapon's power, pellet characteristics, and shooting distance. In our case, two pellets remained in the body — one in the thorax and the other in the lumbar region — while two others traversed the soft tissues and exited through the skin.

In many countries, the sale, use, and transport of air guns are explicitly regulated by law. For example, Germany, England, France, Italy, Spain, and the Netherlands impose restrictions on muzzle energy and the minimum age of acquisition and use. In contrast, Japan and Canada enforce stricter regulations, requiring licenses for acquisition and banning air guns that closely resemble firearms. In our country, air guns are legally defined as “sports

and target rifles and pistols.” Their sale to individuals under 18 is prohibited, and their use is restricted to sporting purposes; their use for hunting is forbidden during closed hunting seasons. However, detailed regulations addressing technical specifications — such as weapon design, muzzle energy, pellet diameter, and material composition — are lacking (19).

CONCLUSION

In conclusion, although air guns are often perceived as toy weapons, they are capable of causing serious injury and even death. To prevent such outcomes, public awareness campaigns should emphasize the potential dangers of air guns, and preventive measures must be implemented to reduce their accessibility, particularly among young people. Through legislation, production standards, licensing requirements, and age- and use-related restrictions should be clearly defined, and the same level of regulatory oversight applied to firearms should also be extended to air guns.

Conflict of Interests

The authors declare that there is no conflict of interest in the study.

Financial Disclosure

The authors declare that they have received no financial support for the study.

Patient Informed Consent

Written informed consent was obtained from the patient's next of kin.

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